

US006661203B2

(12) United States Patent Wolin et al.

(10) Patent No.: US 6,661,203 B2

(45) **Date of Patent:** Dec. 9, 2003

(54) BATTERY CHARGING AND DISCHARGING SYSTEM OPTIMIZED FOR HIGH TEMPERATURE ENVIRONMENTS

(75) Inventors: Dale Wolin, Boise, ID (US); Eugene

Cohen, Eagle, ID (US); Richard G.

Sevier, Boise, ID (US)

(73) Assignee: Hewlett-Packard Development

Company, L.P., Houston, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35

U.S.C. 154(b) by 44 days.

(21) Appl. No.: 10/011,140

(22) Filed: Nov. 12, 2001

(65) Prior Publication Data

US 2003/0090238 A1 May 15, 2003

(51) Int. Cl. ⁷		H02J	7/00
-----------------------------------	--	------	------

320/127, 112, 144, 150, 153; 324/426,

(56) References Cited

U.S. PATENT DOCUMENTS

5,572,110	A	*	11/1996	Dunstan	320/106
5,789,899	Α	*	8/1998	van Phuoc et al	320/133
6,160,377	Α	*	12/2000	Fujii	320/117
6,271,643	B1	*	8/2001	Becker et al	320/112
6,286,109	B1	*	9/2001	Pirdy	713/340
6,366,056	B 1	*	4/2002	Podrazhansky et al	320/141

^{*} cited by examiner

Primary Examiner—Michael Sherry Assistant Examiner—Lawrence Luk

(57) ABSTRACT

A method and apparatus for controlling the charge and discharge currents in a battery (2) as a function of temperature. When a battery (2) is charged or discharged in an environment that approaches its design operating temperature extreme, the currents are reduced to limit self-heating of the battery and thus extend the useful operating environment temperature range. A temperature sensor (18) is coupled to a controller (6) to sense the battery (2) temperature. The temperature information is used to set a suitable charging or discharging current (8).

31 Claims, 2 Drawing Sheets

